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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,757	06/15/2001	Kiyotaka Wasa	35.C15462	5938

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EXAMINER	
TUGBANG, ANTHONY D	

ART UNIT	PAPER NUMBER
3729	15

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/880,757	WASA ET AL.	
	Examiner	Art Unit	
	Dexter Tugbang	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-28 and 61-83* is/are pending in the application.

4a) Of the above claim(s) *24-28 and 61-72* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *73-83* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,6,7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of the invention of Group II, Claims 73-83 in Paper No. 13 is acknowledged. The traversal is on the ground(s) that to examine both of the inventions of Groups I and II would be essentially the same search and thus, would not be a burdensome search. This is not found persuasive because the search for both of the inventions of Groups I and II would not be the same, or the search for Group I would not be required for Group II. Thus, each invention would have clear, distinct and different lines of patentability, in which each of the inventions would have non-coextensive searches. Therefore, there would be a burdensome search for the examiner.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 24-28 and 61-72 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 14.

Specification

3. The abstract of the disclosure is objected to because the abstract appears to be greater than 150 words in length and is not directed to the claimed invention, i.e. process of making. Correction is required. See MPEP § 608.01(b).

4. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old

apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:
(1) if a machine or apparatus, its organization and operation;
(2) if an article, its method of making;
(3) if a chemical compound, its identity and use;
(4) if a mixture, its ingredients;
(5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A Process of Manufacturing a Piezoelectric Element.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 73-83 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 73, the phrases of "the temperature at the time of formation" (lines 5-6) and "the amount of zirconium contained in the second layer" (line 8), each lack positive antecedent basis. The same problems above with Claim 73 also exists in Claim 83.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 73, 74, 79-81 and 83 are rejected under 35 U.S.C. 102(b) as being anticipated by Moynihan et al 5,500,988.

Moynihan discloses a method of manufacturing a piezoelectric element comprising: forming on a support substrate 10 (in Fig. 1); a first layer (electrodes 17) having a perovskite structure and a second layer having a perovskite structure and zirconium (see col. 1, lines 14-16); forming the first and second layers to 800 °C with the first layer having no, or zero, composition of zirconium (see col. 4, lines 31-37); and cooling from the formation temperature of 800 °C to normal room temperature (see col. 3, lines 29-42). The range of cooling of Moynihan, i.e. from 800 °C to normal room temp., overlaps the claimed range of "at least to 450 °C". The cooling

speed of Moynihan can be calculated to approximately 1560 °C/min, which satisfies the claimed speed of "at least 30 °C/minute".

Regarding Claim 74, the "intermediate layer" is read as layer 24 and since the first layer 17 has no zirconium composition and the second layer has a zirconium composition, the concentration from first layer to second layer can be said to be increased inclinatorily.

Regarding Claims 79-81, Moynihan further teaches forming the second layer in a range of 1-25 μm, which overlaps the ranges of the claimed second layer in each of Claims 79 and 80, as well as the first layer 17 being formed at 0.2 μm (see col. 4, lines 31-38), which satisfies the range of Claim 81.

Regarding Claim 83, the claimed "element for preventing crystallization growth during a thin film process" (lines 5-6) is alternatively read as electrode layer 17.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 75-78 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moynihan et al in view of European Patent Publication EP 0 930 165, referred to hereinafter as EP'165.

Moynihan discloses the claimed manufacturing method as previously discussed. Moynihan does not teach the detailed features as recited in each of Claims 75-78 and 82.

Regarding Claim 75, EP'165 teaches a piezoelectric manufacturing process having at least one example of a zirconium/titanium ratio of 50/50 (see col. 8, lines 54-56). The advantage of the EP'165 manufacturing process provides high piezoelectric characteristics with thin piezoelectric films (see col. 2, lines 8-12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Moynihan by including the manufacturing process of EP'165, to advantageously provide high piezoelectric characteristics with thin piezoelectric films.

Regarding Claims 76, 77, 78 and 82, the crystal orientation of the piezoelectric element, i.e. mono-orientational, (100) direction orientation, or (111) direction orientation, are all considered to be effective variables within the level of ordinary skill in the art of forming piezoelectric thin films and it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a crystal orientation of a mono-orientational, (100) direction orientation, or (111) direction orientation, since it has been held that discovering optimum values of result effective variables involve only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 9:00 am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3590 for regular communications and 703-305-3588 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.

Dexter Tugbang
Primary Examiner
Art Unit 3729

adt
May 4, 2003